Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
TECHNOLOGICAL ADVISORY COUNCIL (TAC)	)	
TECHNICAL INQUIRY INTO REFORMING TECHNICAL	)	
REGULATIONS	)	ET Docket No. 17-215

I. INTRODUCTION

I think it's notable that, "…the FCC has asked its Technological Advisory Council to help identify FCC technical rules that are obsolete or may be ripe for change." I also take this to mean that diligence in exploring the simplification of certain rules will reduce the FCC's work load for the FCC's Engineers, Practicing Engineers in the field, and ARS operators. I also assume the Commission wants to develop a set of coherent policies for the various radio services and implement changes based on clear, concise, and equitable rules.

In that vein this respondent has a suggestion for bringing a specific Part 97 rule up to date.

II. BACKGROUND

In PR Docket 82-624, the Commission states in part, "…Accordingly, it is evident the time has come to resolve the vexing question of transmitter power definition and measurement. It is also important to make clear that the intention of this proceeding is limited to improving the definition and measurement of transmitting power. *We desire to avoid changing the power that amateur radio stations use*…" (PR Docket 82-624, Paragraph 2). Emphasis mine.

However, that desire was never realized. A3 (DSB) type transmissions faced the penalty of a 3 dB loss in output power, while the SSB mode faced a 1 dB loss in power. At the same time, CW and FM modes gained a 3 dB increase in power, as stated by the Commission in PR Docket 82-624, Paragraph 16.

While clarifying the definition and measurement of transmitting power was a worthwhile goal, the result was a takeaway of output power for certain modes while other modes *gained* output power. This action was neither equitable nor did it achieve the FCC's stated goal.

With today's modern power measurement instrumentation (not available to ARS operators in the past), and its ability to measure peak and average powers, it is time to simplify and update the Part 97 regulations in order to provide an equitable power output system for those modes that were previously penalized.

Furthermore, there has been renewed interest in AM technology and a resurgence in AM DSB operation over the past three decades, as modern integrated and SDR transceivers now include AM capabilities. Many ARS operators have expanded their choice of operating modes to include AM, Digital, and CW, in addition to the commonly used SSB mode.

III. DISCUSSION

FCC rules for power levels spanning the various radio services have been rather contradictory.

In Part 95 of the Citizens Band (CB) rules, § 95.410 states:

"§ 95.410 (CB Rule 10) How much power may I use?

Your CB station transmitter power output must not exceed the following values under any conditions:

AM (A3)—4 watts (carrier power) SSB—12 watts (peak envelope power)," Page 593.

Here, the Peak Envelope Power (PEP) allowed for SSB is *three* (3) times the carrier power.
It is to be noted that with a standard input power of 5 watts and a final stage efficiency of 80%, the carrier power *would* be 4 Watts. For Part 95 the theoretical SSB output power should be 16 Watts PEP, yet the upper bound for Part 95.410 SSB emissions is limited to 12 Watts PEP, or three times the carrier power.

In Part 97 of the ARS rules:

"§ 97.313 Transmitter power standards.

An amateur station must use the minimum transmitter power necessary to carry out the desired communications.
(b) No station may transmit with a transmitter power exceeding 1.5 kW PEP…"

Page 5 of PR Docket 82-624 Footnotes 9 and 10 stated this:

Footnote 9: "For example, PEP is the same as carrier power for frequency modulation (FM) and CW (A1) emissions. For AM DSB (A3) emissions, modulated 100%, the PEP is approximately four times the carrier power."

Footnote 10: "For example, transmitters operating at the current maximum authorized power of 1000 watts input to the final amplifier stage can develop approximately 750 watts of PEP output for FM and CW emission modes, but can develop approximately 1300 watts of PEP output for SSB emissions and approximately 3000 watts for AM DSB emissions."

Here, the FCC assumed a final stage efficiency of 75%, resulting in a carrier power of 750 watts with a PEP for A3 (DSB) of *four* (4) times the carrier power. However, the FCC assumed a final stage efficiency of 80% for Part 95 rules (as described above) for a carrier power of four watts, and a resulting PEP output of *three* (3) times the carrier power.

For commercial AM Broadcast transmitters, as defined in § 73.51, the power to the antenna is always defined in terms of the carrier power in Watts, and never its PEP.

At this point I should also emphasize this following communication's engineering facts about PEP: PEP is equal to carrier power, as in radiotelegraph power, in a properly formed CW transmission. PEP is also equal to the carrier power in an FM, FSK, or RTTY transmission. Although carrier power is the same as PEP for complex modulation forms, such as FSK, the peak envelope power bears no particular ratio or mathematical relationship to longer-term average power in certain envelopes, such as a CW waveform with power overshoot, or with amplitude modulated waveforms, such as SSB or AM voice transmissions.

Typical average power of a SSB voice transmission, for example, is 10-20% of PEP. The percentage of longer term average power to PEP increases with processing and commonly reaches approximately 50% with the assistance of extreme speech processing.

IV. Suggestions for Simplification and Clarification of Part 97 Power Rules

In view of the above, the following wording is suggested in order to simplify Part 97.313, and to affect an equitable set of power standards for all modes.

§ 97.313 Transmitter Power Standards:

(a) An amateur station must use the minimum transmitter power necessary to carry out the desired communications.

(b) where expressed as radio frequency output power measured across an impedance-matched load,

(i) 3000 W peak envelope power for transmitters that produce **any type** of **sideband** emission(s), or

(ii) 1500 W carrier power for transmitters that produce **any other type** of emission.

Note: No changes to be made to the following [Exceptions] subparagraphs as stated in (c), (d), (e), (f), (g), (h), (i), or (j).

Respectfully submitted for your consideration,

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